Contents

VOLUME 4 NUMBER 1

1 **Editorial**

3 **Integration host factor is necessary for lysogenization of *Escherichia coli* by bacteriophage P2**
S. Saha, E. Haggård-Ljungquist & K. Nordström

13 **Characterization of divergent NtrA-dependent promoters in the anaerobically expressed gene cluster coding for hydrogenase 3 components of *Escherichia coli***
S. Lutz, R. Böhm, A. Beier & A. Böck

21 **Isolation of intact FNR protein (M_r 30000) of *Escherichia coli***
M. Trageser, S. Spiro, A. Duchêne, E. Kojro, F. Fahrenholz, J. R. Guest & G. Unden

29 **The function of isolated domains and chimaeric proteins constructed from the transcriptional activators NifA and NtrC of *Klebsiella pneumoniae***
M. H. Drummond, A. Contreras & L. A. Mitchenall

39 **Engineering upstream transcriptional and translational signals of *Bordetella pertussis* serotype 2 fimbrial subunit protein for efficient expression in *Escherichia coli*: *in vitro* autoassembly of the expressed product into filamentous structures**
M. J. Walker, M. Rohde, R. M. Brownlie & K. N. Timmis

49 **Characterization of the *traT* gene and mutants that increase outer membrane permeability from the *Salmonella typhimurium* virulence plasmid**
S. Sukupolvi, R. Vuorio, S.-Y. Qi, D. O'Connor & M. Rhen

59 **Analysis of the subcellular location of pullulanase produced by *Escherichia coli* carrying the *pulA* gene from *Klebsiella pneumoniae* strain UNF5023**
A. P. Pugsley, M. G. Kornacker & A. Ryter

73 **Molecular characterization of *pulA* and its product, pullulanase, a secreted enzyme of *Klebsiella pneumoniae* strain UNF5023**
M. G. Kornacker & A. P. Pugsley

87 **Duplication and variation of the thermostable direct haemolysin (*tdh*) gene in *Vibrio parahaemolyticus***
M. Nishibuchi & J. B. Kaper

101 **Functional analysis of the *fsoC* gene product of the $F7_1$ (*fso*) fimbrial gene cluster**
N. Riegman, D. Acton, R. Sakkers, I. van Die, W. Hoekstra & H. Bergmans

107 **Tn*7* inserts in both orientations at a single chromosomal location and apparently forms cointegrates in *Pasteurella multocida***
N. A. Nnalue

Notes

119 **Processes of genome evolution reflected by base frequency differences among *Serratia marcescens* genes**
P. M. Sharp

123 **Isolation of the *Actinobacillus pleuropneumoniae* haemolysin gene and the activation and secretion of the prohaemolysin by the HlyC, HlyB and HlyD proteins of *Escherichia coli***
D. Gygi, J. Nicolet, J. Frey, M. Cross, V. Koronakis & C. Hughes

129 **Two cyclic AMP-regulated genes from *Dictyostelium discoideum* encode homologous proteins**
D. P. Ramji, A. J. Richards, P. Jagger, A. Bleasby & B. D. Hames

MicroReviews

137 **Pulling the trigger: the mechanism of bacterial spore germination**
S. J. Foster & K. Johnstone

143 **Lipid involvement in protein translocation in *Escherichia coli***
G. J. de Vrije, A. M. Batenburg, J. A. Killian & B. de Kruijff

151 **New perspectives in tetracycline resistance**
A. A. Salyers, B. S. Speer & N. B. Shoemaker

Erratum

157 **Characterization of the *virA* virulence gene of the nopaline plasmid, pTiC58, of *Agrobacterium tumefaciens***
P. Morel, B. S. Powell, P. M. Rogowski & C. I. Kado

VOLUME 4 NUMBER 2

159 **Editorial**

MicroReviews

161 **Functions of the flagellar modes of rotation in bacterial motility and chemotaxis**
M. Eisenbach

Research Articles

169 **Mapping of sequenced genes (700 kbp) in the restriction map of the *Escherichia coli* chromosome**
C. Médigue, J. P. Bouché, A. Hénaut & A. Danchin

189 **Mucoid *Pseudomonas aeruginosa* in cystic fibrosis: mutations in the *muc* loci affect transcription of the *algR* and *algD* genes in response to environmental stimuli**
V. Deretic, J. R. W. Govan, W. M. Konyecsni & D. W. Martin

197 **Isolation of a chitin synthase gene (*CHS1*) from *Candida albicans* by expression in *Saccharomyces cerevisiae***
J. Au-Young & P. W. Robbins

209 **Cloning and characterization of *mepA*, the structural gene of the penicillin-insensitive murein endopeptidase from *Escherichia coli***
W. Keck, A. M. van Leeuwen, M. Huger & E. Wm. Goodell

221 **Molecular analysis of *Haemophilus influenzae* type b pilin gene**
S. Langermann & A. Wright

231 **Nucleotide sequence and expression of an operon in *Escherichia coli* coding for formate hydrogenlyase components**
R. Böhm, M. Sauter & A. Böck

245 **Molecular characterization of the nodulation gene, *nodT*, from two biovars of *Rhizobium leguminosarum***
B. P. Surin, J. M. Watson, W. D. O. Hamilton, A. Economou & J. A. Downie

253 **Export and processing of a fusion between the extracellular heat-stable enterotoxin and the periplasmic B subunit of the heat-labile enterotoxin in *Escherichia coli***
L.-M. Guzmán-Verduzco & Y. M. Kupersztoch

265 **Two precursors of the heat-stable enterotoxin of *Escherichia coli*: evidence of extracellular processing**
J. K. Rasheed, L.-M. Guzmán-Verduzco & Y. M. Kupersztoch

275 **The regulation of transcription of the *gerA* spore germination operon of *Bacillus subtilis***
I. M. Feavers, J. Foulkes, B. Setlow, D. Sun, W. Nicholson, P. Setlow & A. Moir

283 **A 59 kiloDalton outer membrane protein of *Salmonella typhimurium* protects against oxidative intraleukocytic killing due to human neutrophils**
P. S. Stinavage, L. E. Martin & J. K. Spitznagel

295 **Pro-subtilisin E: purification and characterization of its autoprocessing to active subtilisin E *in vitro***
Y. Ohta & M. Inouye

305 **Isolation of a *secY* homologue from *Bacillus subtilis*: evidence for a common protein export pathway in eubacteria**
J.-W. Suh, S. A. Boylan, S. M. Thomas, K. M. Dolan, D. B. Oliver & C. W. Price

Notes

315 **Effect of positive redox potentials (>+400 mV) on the expression of anaerobic respiratory enzymes in *Escherichia coli***
G. Unden, M. Trageser & A. Duchêne

VOLUME 4 NUMBER 3

MicroReviews

321 **The role of transformation in the variability of the *Neisseria gonorrhoeae* cell surface**
J. J. Scocca

329 ***Cis*- and *trans*-acting factors involved in centromere function in *Saccharomyces cerevisiae***
M. Murphy & M. Fitzgerald-Hayes

337 **Aging and senescence of the budding yeast *Saccharomyces cerevisiae***
S. M. Jazwinski

Research Articles

345 ***Escherichia coli* cells resistant to the DNA gyrase inhibitor, ciprofloxacin, overproduce a 60 kD protein homologous to GroEL**
P. Hallett, A. Mehlert & A. Maxwell

355 **Transcriptional analysis of the gene encoding pyruvate formate-lyase-activating enzyme of *Escherichia coli***
M. Sauter & R. G. Sawers

365 **Five genes at the 3′ end of the *Klebsiella pneumoniae pulC* operon are required for pullulanase secretion**
A. P. Pugsley & I. Reyss

381 **Purine biosynthesis in *Escherichia coli* K12: structure and DNA sequence studies of the *purHD* locus**
K. A. Flannigan, S. A. Hennigan, H. H. Vogelbacker, J. S. Gots & J. M. Smith

393 **The coagulase of *Staphylococcus aureus* 8325-4. Sequence analysis and virulence of site-specific coagulase-deficient mutants**
P. Phonimdaeng, M. O'Reilly, P. Nowlan, A. J. Bramley & T. J. Foster

405 **Activation of potassium efflux from *Escherichia coli* by glutathione metabolites**
M. J. Elmore, A. J. Lamb, G. Y. Ritchie, R. M. Douglas, A. Munro, A. Gajewska & I. R. Booth

413 **Characterization of the *hlyB* gene and its role in the production of the El Tor haemolysin of *Vibrio cholerae* O1**
R. A. Alm & P. A. Manning

427 **Sequence of the *fhuE* outer-membrane receptor gene of *Escherichia coli* K12 and properties of mutants**
M. Sauer, K. Hantke & V. Braun

439 **Characterization of the repertoire of hypervariable regions in the Protein II (*opa*) gene family of *Neisseria gonorrhoeae***
T. D. Connell, D. Shaffer & J. G. Cannon

451 **Comparison and cross-species expression of the acetyl-CoA synthetase genes of the ascomycete fungi, *Aspergillus nidulans* and *Neurospora crassa***
I. F. Connerton, J. R. S. Fincham, R. A. Sandeman & M. J. Hynes

461 **A soluble 60 kiloDalton antigen of *Chlamydia* spp. is a homologue of *Escherichia coli* GroEL**
P. Bavoil, R. S. Stephens & S. Falkow

471 **The regulatory role of the IS*1*-encoded InsA protein in transposition**
D. Zerbib, P. Polard, J.-M. Escoubas, D. Galas & M. Chandler

479 **Transcriptional regulation of the *cytR* repressor gene of *Escherichia coli*: autoregulation and positive control by the cAMP/CAP complex**
P. Gerlach, P. Valentin-Hansen & E. Bremer

489 **Identification of *regB*, a gene required for optimal exotoxin A yields in *Pseudomonas aeruginosa***
M. J. Wick, D. W. Frank, D. G. Storey & B. H. Iglewski

Notes

499 **Multiple promoters control the regulation of the *Pseudomonas aeruginosa regA* gene**
D. G. Storey, D. W. Frank, M. A. Farinha, A. M. Kropinski & B. H. Iglewski

505 **Identification of a 180 kD protein in *Escherichia coli* related to a yeast heavy-chain myosin**
S. Casaregola, V. Norris, M. Goldberg & I. B. Holland

513 **The life-cycle proteins RodA of *Escherichia coli* and SpoVE of *Bacillus subtilis* have very similar primary structures**
B. Joris, G. Dive, A. Henriques, P. J. Piggot & J. M. Ghuysen

VOLUME 4 NUMBER 4

MicroReviews

519 **Structure and dynamics of the colicin E1 channel**
W. A. Cramer, F. S. Cohen, A. R. Merrill & H. Y. Song

527 **Analysis of the structure-function relationship of *Pseudomonas aeruginosa* exotoxin A**
M. J. Wick, A. N. Hamood & B. H. Iglewski

Research Articles

537 **Constraints in chromosomal inversions in *Escherichia coli* are not explained by replication pausing at inverted terminator-like sequences**
V. François, J. Louarn, J. Patte, J.-E. Rebollo & J.-M. Louarn

543 **Differential gene expression during sporulation in *Bacillus subtilis*: structure and regulation of the *spoIIID* gene**
C. M. Stevens & J. Errington

553 **The major subunit of *Escherichia coli* type 1 fimbriae is not required for D-mannose-specific adhesion**
P. Klemm, K. A. Krogfelt, L. Hedegaard & G. Christiansen

561 **Mini-Mu mediates deletion-inversions *in vivo* by intra-transposon transposition**
D. R. F. Leach, E. A. Okely & M. I. Percy-Robb

567 **Two plasmids other than the nodulation plasmid are necessary for formation of nitrogen-fixing nodules by *Rhizobium leguminosarum***
M. F. Hynes & N. F. McGregor

575 **The identification of the *Escherichia coli ftsY* gene product: an unusual protein**
D. R. Gill & G. P. C. Salmond

585 **The purine-cytosine permease gene of *Saccharomyces cerevisiae*: primary structure and deduced protein sequence of the *FCY2* gene product**
E. Weber, C. Rodriguez, M. R. Chevallier & R. Jund

597 **Mechanism for induction of adaptive mutations in *Escherichia coli***
L. Boe

603 **Mechanism of polysialic acid chain elongation in *Escherichia coli* K1**
S. M. Steenbergen and E. R. Vimr

613 **Developmental regulation of cell-type-enriched mRNAs in *Dictyostelium discoideum***
A. J. Corney, A. J. Richards, T. Phillpots & B. D. Hames

625 **LamB (maltoporin) of *Salmonella typhimurium*: isolation, purification and comparison of sugar binding with LamB of *Escherichia coli***
K. Schülein & R. Benz

633 **The *ami* locus of the Gram-positive bacterium *Streptococcus pneumoniae* is similar to binding protein-dependent transport operons of Gram-negative bacteria**
G. Alloing, M.-C. Trombe & J.-P. Claverys

645 **Molybdenum cofactor requirement for *in vitro* activation of apo-molybdoenzymes of *Escherichia coli***
G. Giordano, D. H. Boxer & J. Pommier

651 ***Serratia marcescens rpr* gene sensitizes *Escherichia coli* wild-type, *xth*, and *nfo* strains to methyl methanesulphonate**
K. E. Murphy & H. D. Braymer

657 **The cytotoxic protein YopE of *Yersinia* obstructs the primary host defence**
R. Rosqvist, Å. Forsberg, M. Rimpiläinen, T. Bergman & H. Wolf-Watz

Notes

669 ***Ureaplasma urealyticum* urease genes; use of a UGA tryptophan codon**
A. Blanchard

677 **A lipopeptide-encoding sequence upstream from the *lysA* gene of *Pseudomonas aeruginosa***
A. Jann, D. Cavard, C. Martin, B. Cami & J.-C. Patte

683 **A physical map of the *Mycoplasma genitalium* genome**
S. D. Colman, P.-C. Hu, W. Litaker & K. F. Bott

VOLUME 4 NUMBER 5

MicroReviews

689 **Genetic functions and cell–cell interactions in the pheromone-inducible plasmid transfer system of *Enterococcus faecalis***
G. M. Dunny

697 **The 'Bayer bridges' confronted with results from improved electron microscopy methods**
E. Kellenberger

707 **Genetic instability and hypervariability in *Streptomyces ambofaciens*: towards an understanding of a mechanism of genome plasticity**
P. Leblond, P. Demuyter, J. M. Simonet & B. Decaris

Research Articles

715 **The *arcB* gene of *Escherichia coli* encodes a sensor-regulator protein for anaerobic repression of the *arc* modulon**
S. Iuchi, Z. Matsuda, T. Fujiwara & E. C. C. Lin

729 **Transposition of Tn*916* to different sites in the chromosome of *Neisseria meningitidis*: a genetic tool for meningococcal mutagenesis**
S. Kathariou, D. S. Stephens, P. Spellman & S. A. Morse

737 **Pulmonary dehydration and infection in cystic fibrosis: evidence that ethanol activates alginate gene expression and induction of mucoidy in *Pseudomonas aeruginosa***
J. D. DeVault, K. Kimbara & A. M. Chakrabarty

747 **Integrity of *Escherichia coli* P pili during biogenesis: properties and role of PapJ**
J. M. Tennent, F. Lindberg & S. Normark

759 **The *N*-terminal region of an endoglucanase from *Pseudomonas fluorescens* subspecies *cellulosa* constitutes a cellulose-binding domain that is distinct from the catalytic centre**
H. J. Gilbert, J. Hall, G. P. Hazlewood & L. M. A. Ferreira

769 **Stable expression of meningococcal class 1 protein in an antigenically reactive form in outer membranes of *Escherichia coli***
D. A. White, A. K. Barlow, I. N. Clarke & J. E. Heckels

777 **Cloning of a large gene cluster involved in *Erwinia amylovora* CFBP1430 virulence**
M. A. Barny, M. H. Guinebretière, B. Marçais, E. Coissac, J. P. Paulin & J. Laurent

787 **Genetic characterization of *Bordetella pertussis* filamentous haemagglutinin: a protein processed from an unusually large precursor**
M. Domenighini, D. Relman, C. Capiau, S. Falkow, A. Prugnola, V. Scarlato & R. Rappuoli

801 **Chromosome-specific identification and quantification of S1 nuclease-sensitive sites in yeast chromatin by pulsed-field gel electrophoresis**
E.-M. Geigl & F. Eckardt-Schupp

811 **Cloning and sequence analysis of linear plasmid telomeres of the bacterium *Borrelia burgdorferi***
J. Hinnebusch, S. Bergström & A. G. Barbour

821 **The complete nucleotide sequence of the *Pasteurella multocida* toxin gene and evidence for a transcriptional repressor, TxaR**
S. K. Petersen

831 **Sequence and relatedness in other bacteria of the *Pseudomonas aeruginosa oprP* gene coding for the phosphate-specific porin P**
R. Siehnel, N. L. Martin & R. E. W. Hancock

Notes

839 **High-efficiency transformation system for the biocontrol agents, *Trichoderma* spp.**
A. Herrera-Estrella, G. H. Goldman & M. Van Montagu

845 **Novobiocin-resistance sequences from the novobiocin-producing strain *Streptomyces niveus***
J. I. Mitchell, P. G. Logan, K. E. Cushing & D. A. Ritchie

851 **An inversion truncating the *creA* gene of *Aspergillus nidulans* results in carbon catabolite derepression**
H. N. Arst, Jr, D. Tollervey, C. E. A. Dowzer & J. M. Kelly

855 ***Wolinella succinogenes* fumarate reductase contains a dihaem cytochrome *b***
C. Körtner, F. Lauterbach, D. Tripier, G. Unden & A. Kröger

VOLUME 4 NUMBER 6

MicroReviews

861 **Recent advances in peptide chain termination**
W. J. Craigen, C. C. Lee & C. T. Caskey

867 **Intron-associated splicing reactions in bacteriophage T4**
F. Maley, F. K. Chu & G. F. Maley

873 **Structure and function of haemolysin B, P-glycoprotein and other members of a novel family of membrane translocators**
M. A. Blight & I. B. Holland

Research Articles

881 **DNA from diverse sources manifests cryptic low-level transcription in *Escherichia coli***
W. G. Miller & R. W. Simons

895 **Sequence analysis of *Enterococcus faecalis* aggregation substance encoded by the sex pheromone plasmid pAD1**
D. Galli, F. Lottspeich & R. Wirth

905 **Homologous DNA sequences on the virulence plasmids of pathogenic *Yersinia* and *Salmonella dublin* Lane**
M. Krause, J. Fierer & D. Guiney

913 **Insertion of an extra amino acid is the main cause of the low affinity of penicillin-binding protein 2 in penicillin-resistant strains of *Neisseria gonorrhoeae***
J. A. Brannigan, I. A. Tirodimos, Q.-Y. Zhang, C. G. Dowson & B. G. Spratt

921 **Analysis of three *nodD* genes in *Rhizobium leguminosarum* biovar *phaseoli; nodD*1 is preceded by *nolE*, a gene whose product is secreted from the cytoplasm**
E. O. Davis & A. W. B. Johnston

933 **Regulatory functions of the three *nodD* genes of *Rhizobium leguminosarum* biovar *phaseoli***
E. O. Davis & A. W. B. Johnston

943 **Octanoylation of the lipoyl domains of the pyruvate dehydrogenase complex in a lipoyl-deficient strain of *Escherichia coli***
S. T. Ali, A. J. G. Moir, P. R. Ashton, P. C. Engel & J. R. Guest

951 **Developmental expression and characterization of the gene encoding spore coat protein SP60 in *Dictyostelium discoideum***
D. C. C. Widdowson, J. A. Proffitt, P. S. Jagger, A. J. Richards & B. D. Hames

961 **Tn*552*, a novel transposable element from *Staphylococcus aureus***
S.-J. Rowland & K. G. H. Dyke

977 **Localized transposon Tn*5* mutagenesis of the photosynthetic gene cluster of *Rhodobacter sphaeroides***
S. A. Coomber, M. Chaudhri, A. Connor, G. Britton & C. N. Hunter

991 **The Min DNA inversion enzyme of plasmid p15B of *Escherichia coli* 15T$^-$: a new member of the Din family of site-specific recombinases**
S. Iida, H. Sandmeier, P. Hübner, R. Hiestand-Nauer, K. Schneitz & W. Arber

999 **The identification, characterization, sequencing and mutagenesis of the genes (*hupSL*) encoding the small and large subunits of the H_2-uptake hydrogenase of *Azotobacter chroococcum***
C. M. Ford, N. Garg, R. P. Garg, K. H. Tibelius, M. G. Yates, D. J. Arp & L. C. Seefeldt

1009 **Construction of isogenic gonococci with variable porin structure: effects on susceptibility to human serum and antibiotics**
N. Carbonetti, V. Simnad, C. Elkins & P. F. Sparling

1019 **Integration host factor affects expression of two genes at the conjugal transfer origin of plasmid R100**
W. B. Dempsey & B. E. Fee

1029 **Sequence of the *peh* gene of *Erwinia carotovora*: homology between *Erwinia* and plant enzymes**
J. C. D. Hinton, D. R. Gill, D. Lalo, G. S. Plastow & G. P. C. Salmond

1037 **Structural analysis of the *pehA* gene and characterization of its protein product, endopolygalacturonase, of *Erwinia carotovora* subspecies *carotovora***
H. T. Saarilahti, P. Heino, R. Pakkanen, N. Kalkkinen, I. Palva & E. T. Palva

1045 **Role of His residues in *Bacillus subtilis* cytochrome *b*558 for haem binding and assembly of succinate:quinone oxidoreductase (complex II)**
H. Fridén & L. Hederstedt

VOLUME 4 NUMBER 7

MicroReviews

1057 **Surface-induced swarmer cell differentiation of *Vibrio parahaemolyticus***
L. McCarter & M. Silverman

1063 **Translation initiation in *Escherichia coli*: old and new questions**
N. Jacques & M. Dreyfus

1069 **Outer membrane proteins of *Pseudomonas***
R. E. W. Hancock, R. Siehnel & N. Martin

1077 **Signal transduction and gene regulation through the phosphorylation of two regulatory components: the molecular basis for the osmotic regulation of the porin genes**
T. Mizuno & S. Mizushima

1083 **Molecular aspects of phosphate transport in *Escherichia coli***
N. N. Rao & A. Torriani

Research Articles

1091 **Characterization of a *Listeria monocytogenes*-specific protein capable of inducing delayed hypersensitivity in *Listeria*-immune mice**
S. Göhmann, M. Leimeister-Wächter, E. Schiltz, W. Goebel & T. Chakraborty

1101 **The normally periplasmic enzyme β-lactamase is specifically and efficiently translocated through the *Escherichia coli* outer membrane when it is fused to the cell-surface enzyme pullulanase**
M. G. Kornacker & A. P. Pugsley

1111 **Construction and characterization of a protective antigen-deficient *Bacillus anthracis* strain**
A. Cataldi, E. Labruyère & M. Mock

1119 **Sequence, localization and function of the invasin protein of *Yersinia enterocolitica***
V. B. Young, V. L. Miller, S. Falkow & G. K. Schoolnik

1129 ***Mycoplasma pneumoniae* DNA gyrase genes**
S. D. Colman, P.-C. Hu & K. F. Bott

1135 **Genetic variation at the *omp*2 porin locus of the brucellae: species-specific markers**
T. A. Ficht, S. W. Bearden, B. A. Sowa & H. Marquis

1143 ***Streptococcus pneumoniae* possesses canonical *Escherichia coli* (sigma 70) promoters**
D. A. Morrison & B. Jaurin

1153 **Characterization of the *virB* operon of an *Agrobacterium tumefaciens* Ti plasmid: nucleotide sequence and protein analysis**
K. Shirasu, P. Morel & C. I. Kado

1165 **Isolation and characterization of the *recA* gene of *Bordetella pertussis***
S. A. Kuhl, R. P. McCreary, J. D. Bannan & R. L. Friedman

1173 **Identification and characterization of a porcine-specific transferrin receptor is *Actinobacillus pleuropneumoniae***
G. C. Gonzalez, D. L. Caamano & A. B. Schryvers

1181 **Apo forms of cytochrome c_{550} and cytochrome cd_1 are translocated to the periplasm of *Paracoccus denitrificans* in the absence of haem incorporation caused by either mutation or inhibition of haem synthesis**
M. D. Page & S. J. Ferguson

1193 **Immunocytochemical analysis of P-fimbrial structure: localization of minor subunits and the influence of the minor subunit FsoE on the biogenesis of the adhesin**
N. Riegman, H. Hoschützky, I. van Die, W. Hoekstra, K. Jann & H. Bergmans

1199 **Protein transfer into the recipient cell during bacterial conjugation: studies with F and RP4**
C. E. D. Rees & B. M. Wilkins

1207 **Inducible erythromycin resistance in staphylococci is encoded by a member of the ATP-binding transport supergene family**
J. I. Ross, E. A. Eady, J. H. Cove, W. J. Cunliffe, S. Baumberg & J. C. Wootton

Notes

1215 **Generation of capsule-deficient *Neisseria meningitidis* strains by homologous recombination**
M. Frosch, E. Schultz, E. Glenn-Calvo & T. F. Meyer

1219 **On the evolutionary origins of the bacterial phosphoenolpyruvate:sugar phosphotransferase system**
L.-F. Wu & M. H. Saier, Jr

IUMS News

1223 **COBIOTECH's role in biotechnology worldwide**
P. Gerhardt

Erratum

1225 **Duplication and variation of the thermostable direct haemolysin (*tdh*) gene in *Vibrio parahaemolyticus***
M. Nishibuchi & J. B. Kaper

VOLUME 4 NUMBER 8

MicroReviews

1227 **What are antibiotics? Archaic functions for modern activities**
J. Davies

1233 **Post-transcriptional control in the polycistronic operon environment: studies of the *atp* operon of *Escherichia coli***
J. E. G. McCarthy

Research Articles

1241 **Overproduction and purification of the Tn*10*-specified inner membrane tetracycline resistance protein Tet using fusions to β-galactosidase**
R. K. Hickman, L. M. McMurry & S. B. Levy

1253 **The influence of the *Klebsiella pneumoniae* regulatory gene *nifL* upon the transcriptional activator protein NifA**
E. Morett, R. Kreutzer, W. Cannon & M. Buck

1259 **The TraT lipoprotein as a vehicle for the transport of foreign antigenic deterinants to the cell surface of *Escherichia coli* K12: structure–function relationships in the TraT protein**
I. M. Taylor, J. L. Harrison, K. N. Timmis & C. D. O'Connor

1269 **Molecular mechanism for the antigonococcal action of lysosomal cathepsin G**
W. M. Shafer, V. C. Onunka, M. Jannoun & L. W. Huthwaite

1279 **Cell-type-specific genes expressed late in *Dictyostelium* development show markedly different responses to 3′5′ cyclic AMP**
A. J. Richards, A. J. Corney & B. D. Hames

1293 **Characterization of fourteen strains of *Neisseria gonorrhoeae*: structural analyses and serum reactivities**
R. K. Pettit, J. C. Szuba & R. C. Judd

1303 **Nucleotide sequence and codon usage of the elongation factor Tu(EF-Tu) gene from *Mycoplasma pneumoniae***
D. Yogev, S. Sela, H. Bercovier & S. Razin

1311 **Mannose-sensitive haemagglutination in the absence of piliation in *Escherichia coli***
S. J. Hultgren, J. L. Duncan, A. J. Schaeffer & S. K. Amundsen

1319 **Identification and sequence analysis of the gene encoding the transcriptional activator of the formate hydrogenlyase system of *Escherichia coli***
V. Schlensog & A. Böck

1329 **Evidence for the exchange of segments between genomes during the evolution of lambdoid bacteriophages**
P. J. Highton, Y. Chang & R. J. Myers

1341 **The role of direct oligonucleotide repeats in gonococcal pilin gene variation**
S. A. Hill, S. G. Morrison & J. Swanson

1353 **Type V collagen as the target for type-3 fimbriae, enterobacterial adherence organelles**
A.-M. Tarkkanen, B. L. Allen, B. Westerlund, H. Holthöfer, P. Kuusela, L. Risteli, S. Clegg & T. K. Korhonen

1363 **Secretion of *Ricinus communis* glyceraldehyde-3-phosphate dehydrogenase by *Escherichia coli***
W. E. Hekman, D. T. Dennis & J. A. Miernyk

1371 **Lipid modification of the 15 kiloDalton major membrane immunogen of *Treponema pallidum***
B. K. Purcell, M. A. Swancutt & J. D. Radolf

1381 **The mobilization and origin of transfer regions of a *Thiobacillus ferrooxidans* plasmid: relatedness to plasmids RSF1010 and pSC101**
M. Drolet, P. Zanga & P. C. K. Lau

1393 **Purification and characterization of RNase P from *Clostridium sporogenes***
D. M. Roselli & T. L. Marsh

Notes

1401 **Pyoverdin-facilitated iron uptake in *Pseudomonas aeruginosa*: immunological characterization of the ferripyoverdin receptor**
J. M. Meyer, D. Hohnadel, A. Khan & P. Cornelis

1407 **A rapid method for reconstitution of bacterial membrane proteins**
A. Varadhachary & P. C. Maloney

1413 **The benzoylarginine peptidase from *Treponema denticola* (strain ASLM), a human oral spirochaete: evidence for active-site carboxyl groups**
K. K. Mäkinen, C.-Y. Chen, P.-L. Mäkinen, K. Ohta & W. J. Loesche

VOLUME 4 NUMBER 9

MicroReviews

1419 **Triple post-transcriptional control**
D. H. Bechhofer

1425 **Exopolysaccharide production in *Rhizobium* and its role in invasion**
J. X. Gray & B. G. Rolfe

1433 **Towards an understanding of the structural basis of 'forbidden' transport pathways in the *Escherichia coli* lactose carrier: mutations probing the energy barriers to uncoupled transport**
S. C. King & T. H. Wilson

1439 **Proteinase inhibition, immunoglobulin-binding proteins and a novel antimicrobial principle**
L. Björck

Research Articles

1443 ***Escherichia coli* molecular genetic map (1000 kbp): update I**
C. Médigue, A. Hénaut & A. Danchin

1455 **A family of ATPases involved in active partitioning of diverse bacterial plasmids**
M. Motallebi-Veshareh, D. A. Rouch & C. M. Thomas

1465 **How *Escherichia coli* RNA polymerase can negatively regulate transcription from a constitutive promoter**
G. Duval-Valentin & C. Reiss

1477 **Functional organization of the ends of IS*1*: specific binding site for an IS*1*-encoded protein**
D. Zerbib, P. Prentki, P. Gamas, E. Freund, D. J. Galas & M. Chandler

1487 **Nucleotide sequence and control of transcription of the bacteriophage T4 *motA* regulatory gene**
M. Uzan, E. Brody & R. Favre

1497 **Analysis of site-directed mutations in the α- and β-subunits of *Klebsiella pneumoniae* nitrogenase**
H. M. Kent, M. Baines, C. Gormal, B. E. Smith & M. Buck

1505 **Evidence that conserved residues Cys-62 and Cys-154 within the *Azotobacter vinelandii* nitrogenase MoFe protein α-subunit are essential for nitrogenase activity but conserved residues His-83 and Cys-88 are not**
D. R. Dean, R. A. Setterquist, K. E. Brigle, D. J. Scott, N. F. Laird, & W. E. Newton

1513 **The integration–excision system of the conjugative transposon Tn*1545* is structurally and functionally related to those of lambdoid phages**
C. Poyart-Salmeron, P. Trieu-Cuot, C. Carlier & P. Courvalin

1523 **Import-defective colicin B derivatives mutated in the TonB box**
J. Mende & V. Braun

1535 **Developmental-stage-specific plasmid supercoiling in *Chlamydia trachomatis***
M. V. Solbrig, M. L. Wong & R. S. Stephens

1543 **Cysteine-rich outer membrane proteins of *Chlamydia trachomatis* display compensatory sequence changes between biovariants**
J. E. Allen, M. C. Cerrone, P. R. Beatty & R. S. Stephens

1551 **Promoter-upstream activator sequences are required for expression of the *xylS* gene and upper-pathway operon on the *Pseudomonas* TOL plasmid**
A. Holtel, M.-A. Abril, S. Marques, K. N. Timmis & J. L. Ramos

1557 **Cloning and physical mapping of the *sor* genes for L-sorbose transport and metabolism from *Klebsiella pneumoniae***
B. M. Wöhrl & J. W. Lengeler

1567 **Mutagenesis, cloning and complementation analysis of C_4-dicarboxylate transport genes from *Rhodobacter capsulatus***
M. J. Hamblin, J. G. Shaw, J. P. Curson & D. J. Kelly

1575 **Studies on *Clostridium acetobutylicum glnA* promoters and antisense RNA**
P. J. Janssen, D. T. Jones & D. R. Woods

1585 **The pYV plasmid of *Yersinia* encodes a lipoprotein, YlpA, related to TraT**
B. China, T. Michiels & G. R. Cornelis

1595 **Tandem DNA-bound cAMP–CRP complexes are required for transcriptional repression of the *deoP2* promoter by the CytR repressor in *Escherichia coli***
L. Søgaard-Andersen, N. E. Møllegaard, S. R. Douthwaite & P. Valentin-Hansen

Notes

1603 **Conservation of a hexapeptide sequence in the anchor region of surface proteins from Gram-positive cocci**
V. A. Fischetti, V. Pancholi & O. Schneewind

1607 **Characterization of a *Mycobacterium tuberculosis* insertion sequence belonging to the IS*3* family**
R. A. McAdam, P. W. M. Hermans, D. van Soolingen, Z. F. Zainuddin, D. Catty, J. D. A. van Embden & J. W. Dale

VOLUME 4 NUMBER 10

MicroReviews

1615 **Molecular evolution of ubiquitous β-lactamases towards extended-spectrum enzymes active against newer β-lactam antibiotics**
E. Collatz, R. Labia & L. Gutmann

1621 **Regulation of bacterial gene expression by metal–protein complexes**
H. Hennecke

1629 **Precursor/product antiport in bacteria**
B. Poolman

1637 **β-lactamase as a probe of membrane protein assembly and protein export**
J. K. Broome-Smith, M. Tadayyon & Y. Zhang

Research Articles

1645 **Mutations produced by DNA polymerase III holoenzyme of *Escherichia coli* after *in vitro* synthesis in the absence of single-strand binding protein**
M. Carraway, C. Rewinski & M. G. Marinus

1653 **Geographically distinct isolates of *Mycobacterium leprae* exhibit no genotypic diversity by restriction fragment-length polymorphism analysis**
D. L. Williams, T. P. Gillis, & F. Portaels

1661 **HeLa cell invasion by a strain of enteropathogenic *Escherichia coli* that lacks the O-antigenic polysaccharide**
L. W. Riley, L. N. Junio & G. K. Schoolnik

1667 **Functional importance of the *Escherichia coli* ribosomal RNA leader box A sequence for post-transcriptional events**
G. Theißen, S. E. Behrens & R. Wagner

1679 **Spore colour in *Streptomyces coelicolor* A3(2) involves the developmentally regulated synthesis of a compound biosynthetically related to polyketide antibiotics**
N. K. Davis & K. F. Chater

1693 **The molecular structure of the *Corynebacterium glutamicum* threonine synthase gene**
K.-S. Han, J. A. C. Archer & A. J. Sinskey

1703 **Phage-conversion of cytotoxin production in *Pseudomonas aeruginosa***
T. Hayashi, T. Baba, H. Matsumoto & Y. Terawaki

1711 **Distribution of msDNAs among serotypes of enteropathogenic *Escherichia coli* strains**
D. Lim, T. A. T. Gomes, & W. K. Maas

1715 **The variable antigens Vmp7 and Vmp21 of the relapsing fever bacterium *Borrelia hermsii* are structurally analogous to the VSG proteins of the African trypanosome**
N. Burman, S. Bergström, B. I. Restrepo & A. G. Barbour

1727 **Transcriptional analysis of the *glnB–glnA* region of *Rhizobium leguminosarum* biovar *viciae***
M. Chiurazzi & M. Iaccarino

1737 **Involvement of OmpF during reception and translocation steps of colicin N entry**
J.-P. Bourdineaud, H.-P. Fierobe, C. Lazdunski & J.-M. Pagès

1745 **A family of dispersed repeats in *Mycobacterium leprae***
S. A. Woods & S. T. Cole

1753 **Molecular genetic analysis of an FNR-dependent anaerobically inducible *Escherichia coli* promoter**
A. I. Bell, J. A. Cole & S. J. W. Busby

Notes

1765 **Effects of *N*-methyl-D-aspartate receptor ligands on yeast sporulation**
R. Piñón

1771 **Functional similarities between retroviruses and the IS*3* family of bacterial insertion sequences?**
O. Fayet, P. Ramond, P. Polard, M. F. Prère & M. Chandler

1779 **Characterization of FapR, a positive regulator of expression of the 987P operon in enterotoxigenic *Escherichia coli***
P. Klaasen & F. K. de Graaf

1785 **Direction of DNA entry in competent cells of *Bacillus subtilis***
V. Vagner, J.-P. Claverys, S. D. Ehrlich & V. Méjean

1789 **Isolation and characterization of the gene encoding a novel, thermostable serine proteinase from the mould *Tritirachium album* Limber**
B. B. Samal, B. Karan, T. C. Boone, T. D. Osslund, K. K. Chen & Y. Stabinsky

VOLUME 4 NUMBER 11

MicroReviews

1793 **Transcriptional regulatory cascade of nitrogen-fixation genes in anoxygenic photosynthetic bacteria: oxygen- and nitrogen-responsive factors**
R. G. Kranz & D. Foster-Hartnett

1801 **Cascades of sigma factors revisited**
P. Stragier & R. Losick

Research Articles

1807 **Mechanism of post-segregational killing by the *hok/sok* system of plasmid R1: *sok* antisense RNA regulates formation of a *hok* mRNA species correlated with killing of plasmid-free cells**
K. Gerdes, T. Thisted & J. Martinussen

1819 **Nucleotide sequence and organization of the upstream region of the *Corynebacterium glutamicum lysA* gene**
T. Marcel, J. A. C. Archer, D. Mengin-Lecreulx & A. J. Sinskey

1831 **Interconversion of the DNA-binding specificities of two related transcription regulators, CRP and FNR**
S. Spiro, K. L. Gaston, A. I. Bell, R. E. Roberts, S. J. W. Busby & J. R. Guest

1839 **The *par* region of pSC101 affects plasmid copy number as well as stability**
D. Manen, T. Goebel & L. Caro

1847 **Site-directed mutagenesis of the 'zinc finger' DNA-binding domain of the nitrogen-regulatory protein NIT2 of *Neurospora***
Y. H. Fu & G. A. Marzluf

1853 **The *bex* locus in encapsulated *Haemophilus influenzae*: a chromosomal region involved in capsule polysaccharide export**
J. S. Kroll, B. Loynds, L. N. Brophy & E. R. Moxon

1863 **Molecular analysis of the *Escherichia coli* K5 *kps* locus: identification and characterization of an inner-membrane capsular polysaccharide transport system**
A. N. Smith, G. J. Boulnois & I. S. Roberts

1871 **Rates of assembly and degradation of bacterial ice nuclei**
N. M. Watanabe, M. W. Southworth, G. J. Warren & P. K. Wolber

1881 **The importance of the 5′-region in regulating the stability of *sdh* mRNA in *Bacillus subtilis***
L. Melin, H. Fridén, E. Dehlin, L. Rutberg & A. von Gabain

1891 **Instability of bacteriophage Mu transposase and the role of host Hfl protein**
M.-J. Gama, A. Toussaint & M. L. Pato

1899 **Identification and cloning of nodulation genes and host specificity determinants of the broad host-range *Rhizobium leguminosarum* biovar *phaseoli* strain CIAT899**
C. Vargas, L. J. Martinez, M. Megiás & C. Quinto

1911 **Isolation and characterization of efficient plasmid transformation mutants of *Mycobacterium smegmatis***
S. B. Snapper, R. E. Melton, S. Mustafa, T. Kieser & W. R. Jacobs, Jr

1921 **Molecular characterization of *pmbA*, an *Escherichia coli* chromosomal gene required for the production of the antibiotic peptide MccB17**
M. C. Rodríguez-Sainz, C. Hernández-Chico & F. Moreno

1933 **Deletion analysis resolves cell-binding and lytic domains of the *Pasteurella* leukotoxin**
W. T. Cruz, R. Young, Y. F. Chang & D. K. Struck

1941 **The *Escherichia coli unc* transcription terminator enhances expression of *uncC*, encoding the ε subunit of F_1-ATPase, from plasmids by stabilizing the transcript**
A. M. Patel, H. G. Dallmann, E. N. Skakoon, T. D. Kapala & S. D. Dunn

1947 **Cryptic α-toxin gene in toxic shock syndrome and septicaemia strains of *Staphylococcus aureus***
M. O'Reilly, B. Kreiswirth & T. J. Foster

1957 **Molecular evolution of class A β-lactamases: phylogeny and patterns of sequence conservation**
N. Pastor, D. Piñero, A. M. Valdés & X. Soberón

1967 **Larvicidal activity of chimeric *Bacillus thuringiensis* protoxins**
K. C. Raymond, T. R. John and L. A. Bulla, Jr

1975 **Role of the *nodD* and *syrM* genes in the activation of the regulatory gene *nodD3*, and of the common and host-specific *nod* genes of *Rhizobium meliloti***
F. Maillet, F. Debellé & J. Dénarié

1985 **Characterization of two DNA populations of *Giardia lamblia***
G. Ortega-Pierres, R. Alonso, L. Cervantes & C. Montañez

1993 **Identification and characterization of a gene and protein required for glycosylation in the yeast Golgi**
C. Devlin & C. E. Ballou

Addendum

2003 **Corrected sequence of the mannitol (*mtl*) operon in *Escherichia coli***
W. Jiang, L.-F. Wu, J. Tomich, M. H. Saier, Jr & W. G. Niehaus

VOLUME 4 NUMBER 12

MicroReviews

2007 **Protein H1: a role for chromatin structure in the regulation of bacterial gene expression and virulence?**
C. F. Higgins, J. C. D. Hinton, C. S. J. Hulton, T. Owen-Hughes, G. D. Pavitt & A. Seirafi

2013 **The yeast phosphatase system**
K. Vogel & A. Hinnen

2019 **TonB and the Gram-negative dilemma**
K. Postle

2027 **Vitamin B_{12} transport in *Escherichia coli*: energy coupling between membranes**
R. J. Kadner

2035 **Uncharged tRNA, protein synthesis, and the bacterial stringent response**
E. Goldman & H. Jakubowski

Research Articles

2041 **Structure, localization and function of FanF, a minor component of K99 fibrillae of enterotoxigenic *Escherichia coli***
B. L. Simons, P. T. J. Willemsen, D. Bakker, B. Roosendaal, F. K. De Graaf & B. Oudega

2051 **Efflux-mediated antiseptic resistance gene *qacA* from *Staphylococcus aureus*: common ancestry with tetracycline- and sugar-transport proteins**
D. A. Rouch, D. S. Cram, D. DiBerardino, T. G. Littlejohn & R. A. Skurray

2063 **_Bacillus subtilis_ levansucrase: amino acid substitutions at one site affect secretion efficiency and refolding kinetics mediated by metals**
M. F. Petit-Glatron, I. Monteil, F. Benyahia & R. Chambert

2071 **Isolated DNA repeat region from _fcrA76_, the Fc-binding protein gene from an M-type 76 strain of group A streptococci, encodes a protein with Fc-binding activity**
D. G. Heath, M. D. P. Boyle & P. P. Cleary

2081 **Prolongation of the yeast life span by the v-Ha-_RAS_ oncogene**
J. B. Chen, J. Sun & S. M. Jazwinski

2087 **Activation of a cryptic crystal protein gene of _Bacillus thuringiensis_ subspecies _kurstaki_ by gene fusion and determination of the crystal protein insecticidal specificity**
C. Dankocsik, W. P. Donovan & C. S. Jany

2095 **Identification of developmentally regulated _Giardia lamblia_ cyst antigens using GCSA-1, a cyst-specific monoclonal antibody**
H. D. Ward, A. V. Kane, E. Ortega-Barria, G. T. Keusch & M. E. A. Pereira

2103 **Expression patterns of genes encoding elastase and controlling mucoidy: co-ordinate regulation of two virulence factors in _Pseudomonas aeruginosa_ isolates from cystic fibrosis**
C. D. Mohr, L. Rust, A. M. Albus, B. H. Iglewski & V. Deretic

2111 **Generation of a cytotoxic T-lymphocyte response using a _Salmonella_ antigen-delivery system**
J. L. Flynn, W. R. Weiss, K. A. Norris, H. S. Seifert, S. Kumar & M. So

2119 **Characterization of the type 1 fimbrial subunit gene (_fimA_) of _Serratia marcescens_**
W. A. Nichols, S. Clegg & M. R. Brown

2127 **RNase E, an endoribonuclease, has a general role in the chemical decay of _Escherichia coli_ mRNA: evidence that _rne_ and _ams_ are the same genetic locus**
E. A. Mudd, H. M. Krisch & C. F. Higgins

2137 **Molecular characterization of immune inhibitor A, a secreted virulence protease from _Bacillus thuringiensis_**
A. Lövgren, M. Zhang, A. Engström, G. Dalhammar & R. Landén

2147 **Genetic analysis of the cytochrome _c_-aa_3 branch of the _Bradyrhizobium japonicum_ respiratory chain**
M. Bott, M. Bolliger & H. Hennecke

2159 **Specific binding of VirG to the _vir_ box requires a _C_-terminal domain and exhibits a minimum concentration threshold**
B. S. Powell & C. I. Kado

2167 **Attenuated mutants of the intracellular bacterium _Listeria monocytogenes_ obtained by single amino acid substitutions in listeriolysin O**
E. Michel, K. A. Reich, R. Favier, P. Berche & P. Cossart

2179 **Induction of a φC31 prophage inhibits rRNA transcription in _Streptomyces coelicolor_ A3(2)**
T. M. Clayton & M. J. Bibb

2187 **Identification of hypoxanthine and guanine as the co-repressors for the purine regulon genes of _Escherichia coli_**
L. M. Meng & P. Nygaard

2193 **Specific β-lactam antibiotics inhibit secretion of lipo-β-lactamase in yeast**
A. London & O. Pines

Notes

2201 **Mapping of the msDNA operon in the chromosome of _Escherichia coli_ B**
D. Lim & W. K. Maas

Indexes

2205 **Subject Index**

2213 **Author Index**